

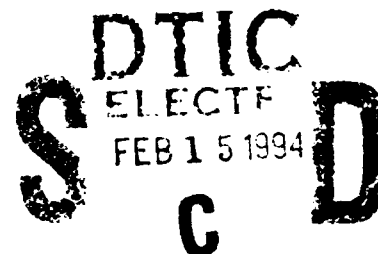
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AFFORDABILITY: The Key to a Strong Defense from Now On

by

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Prepared for
1993 DoD Cost Analysis Symposium
Innovative Estimating Techniques for
Business Base Changes & Related Overhead Impacts

ABSTRACT

Major reductions to the defense budget will cause a radical restructuring of the defense industrial base. Understanding the cost implications of budget cutbacks is essential to manage this restructuring to assure that an appropriate force mix is available to defend our nation.

Cost analysis must play a pivotal role in redefining our defense posture. But tools do not exist that can provide reasonable estimates of the effects of a greatly changed environment. Current tools will not adequately reflect structural changes to the defense base because they are retrospective (i.e., parametric) in nature. Therefore, a proper definition of the problems is required together with new tools for estimating that consider environmental shifts.

INTRODUCTION

Defense is the one government program that has accomplished its specified objectives. It has protected the United States from foreign aggressors and is largely responsible for the demise of our chief enemy, the USSR. This success has brought substantial rewards including, especially, a greatly diminished strategic nuclear threat and the ability to modify the allocation of public resources to meet other pressing needs.

Although the success achieved by our strong defense has benefited the public at large, substantial penalties have, ironically, been thrust upon those responsible, they include: DoD and Service civilians and members of the military, contractor employees, and investors. These penalties consist of: un- and underemployment; the devaluation of real property, capital assets, and corporate value; and a diminished defense industrial base.

Few would argue against continuing to maintain a strong, if differently configured,

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AFFORDABILITY:

THE KEY TO A STRONG DEFENSE FROM NOW ON

Major reductions to the defense budget will cause a radical restructuring of the defense industrial base. Understanding the cost implications of budget cutbacks is essential to managing this restructuring in a manner that will assure that an appropriate (with regard to technology, quantity and quality) mix of weapon systems is available to defend our nation.

Available cost models cannot provide reasonable estimates of the affects of lower production rates caused by budget cutbacks on overhead and direct expenses. They fail to adequately reflect reality and they are retrospective (i.e., parametric) in nature. Therefore, new methods which reflect a proper definition of the problem and possibilities for solving it are required.

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national defense. Yet the informed observer has little evidence to suggest this is being pursued rationally and systematically. One reality is that the future of defense will be driven more by relative budget scarcities than any other factor. Therefore, it is important to have sound bases for making cost/utility tradeoffs. Cost analysis must play a major role in this process. However, since environmental conditions that drive cost will be altered dramatically, tried and true analytical tools will require major revision. A brief assessment is made of how the defense industrial base will evolve before examining the task confronting the cost analysis community.

FACTORS SHAPING THE DEFENSE INDUSTRIAL BASE

Budget scarcities will require firms supplying the defense establishment and customers within the defense establishment to adapt. Dramatic changes are already taking place within the defense industry. Just consider some acquisitions and spinoffs that have occurred during the past two years. For example:

- Hughes Aircraft Corporation acquired General Dynamics missiles and merged both operations into the Hughes Tucson plant.
- Lockheed acquired GD aircraft facilities and with them GD's share of the ATF and remaining F-16 production.
- Martin Marietta bought General Electric's defense operations.
- Honeywell spun off its defense operations as Alliant Tech Systems.
- LTV's defense businesses were sold to several contractors.

These major consolidations have resulted and will continue to result in jettisoning of over capacity and in creating fewer but stronger competing firms.

The reality of a shrinking market has also been felt within defense firms. For example, fewer new business opportunities and fewer firms competing for them means a dramatic reduction in engineering, technical, and support personnel required for research and development and proposal preparation. Furthermore, since many of these personnel have traditionally been carried as direct support by ongoing production programs between new business opportunities, their loss will mean a change in the cost structure of many programs.

Although most large firms have responded to the necessity of downsizing, few have fully understood that which must become the maxim of the future: *It is not useful to do something better if it should not be done at all.* In an article published in *CALS Journal*, Spring 93, Paul Strassmann said that in the 1970's Xerox discovered:

"...even with an assumption of zero manufacturing costs our delivered product cost was greater than our competitors' prices. Even a disregard of manufacturing costs would not have helped Xerox because the transaction costs for marketing, accounting, promotion, and what some of you call bureaucracy, was greater than

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what the competitor was able to achieve... From this I learned the issue of productivity revolves first around the necessity to streamline business processes." Thus, a further shake-out of the defense industry is inevitable as firms begin to reengineer themselves rather than simply pruning dead wood.

Clearly, the potential for long term cost savings exists within the defense industry, however, many short to midterm factors will mitigate against them. Personnel costs may eventually respond to a shrinking demand and decrease, but immediate costs include increases for termination in the form of higher unemployment taxes and severance pay for laid-off workers, and relocation expenses for transferred employees. Facilities and other capital costs for under utilized assets may remain until leases have expired or amortization is complete. Environmental cleanup costs may become an even more important cost element in the future as defense sites are converted to other uses.

The long-term impact of declining budgets is apparently not fully appreciated within DoD and the Services. Severe budget reductions are not scalable. Specifically, the proportion of the defense budget required for operations and support will grow dramatically as fewer replacement systems are purchased and retrofits and upgrades become more prominent. This in turn will force wrenching decisions about program cancellations and production slow downs.

"Saving" programs will cause the costs of other programs to escalate dramatically as reduced business bases will increase overhead costs and lower production rates will increase direct costs. Combined, these factors will cause the unit costs of resources purchased with defense funds to increase dramatically. Thus, just as contractors must reengineer their operations to survive, the DoD establishment must reengineer theirs to adequately defend our nation.

Reengineering within DoD must be comprehensive and driven by astute and aggressive management because there are no market forces to propel it. The first step must be to address openly the government's enduring fiction that it does not have an industrial policy. Obviously:

- Having voluminous regulations prescribing how items are to be purchased, manufactured, tested, inspected, documented, and delivered;
- Underwriting the proposal and R&D expenses of existing suppliers;
- Determining tax liabilities, and
- Providing plant and capital assets (e.g., GOCO)

constitutes an industrial policy. This policy is manifest in the fact that virtually no large prime contractor has combined its commercial and defense operations.

DoD must now confront future realities. Namely,

- Most technical innovation will come from commercial enterprises,
- Buying practices must be altered greatly eliminate non-value added procedures,
- We can no longer afford the luxury of an unnecessarily large base of weapon system platform manufacturers.

The implications of these issues are profound.

If future innovation used for defense will come from commercial ventures, there must be a means of giving them an incentive to participate on defense projects. Instead, IR&D and B&P allowances for current suppliers act as a barrier by subsidizing them for participating while requiring newcomers to invest their own capital. This must change for at least some sectors of the defense market.

As commercial procurement and foreign cooperation become more prevalent to multiply and exploit R&D expenditures, burdensome procurement regulations whose primary outcome has been the creation of large government and contractor bureaucracies will become unacceptable. Additionally, it has become all too obvious that the government is unable to adapt and deal with non-traditional (i.e., neither completely off-the-shelf nor developmental) items.

A recent joint service program showed the government's inability to define a procurement strategy that would provide an appropriate level of testing for a manufacturing development item. Specifically, there was a quandary over whether it should be treated as an off-the-shelf buy or as a new development program. The correct answer was in between but, of course, by following CYA guidelines it was treated as a new development, thereby, substantially increasing cost.

Several contractors for each type of weapon system platform have been established by spreading contracts based upon which firms had production winding down on existing programs. This has been supported by studies and refuted by government authorities. However, we can no longer afford the luxury of *so much* excess plant capacity and redundant engineering talent when new future programs will be sparse. Thus, an assessment of the costs and benefits of funding so many redundant capabilities must be made. The flip side, of course, is to assure that critical defense needs are adequately supported.

Either the defense establishment must enter a new era of efficiency and management in a time of scarcity, or our national security will be seriously compromised. However, making sound decisions to achieve a strong national defense during a period of severe budget constraints will require credible estimates of the costs of alternative policies and strategies.

WHAT COST ANALYSTS MUST DO

Parametric methods have been the cornerstone of cost analysis since its inception. They support the estimation of future systems or functions by finding correlation among various factors and costs. Such factors have commonly included measures for technology, physical dimensions, and production size.

Using parametric methods (and supplementing them occasionally with analogies, engineering buildups, and expert judgment as required) cost analysts have served their clients well. In the future, cost analysts will be seriously challenged by changes in the composition of the data they rely upon as the bases of their estimates. In addition, their clients will include more senior management personnel.

The important thing to remember about data used to derive CERs parametrically is that there is an implicit assumption that the underlying procedures for performing tasks related to producing a product or performing a task are either consistent over time or evolving in a way that is parallel to technological change. In other words, consistency in procedures, methods, and organization has allowed cost analysts to ignore them in making their estimates. But, if an organization wakes up--as Xerox did years ago--and finds it must radically change many facets of its operation, organization, procedures and methods, much previous data will become misleading as the bases for estimates.

Thus, cost analysts must make a much greater effort to determine and understand the content of their data at a detailed level. By so doing, they will be able to make necessary heuristic adjustments. The attention to detail necessary to arrive at reliable and valid cost estimates is exemplified by problems in attempting to assess the effect of varied production rates on cost.

Assessing the effect of production rate changes on cost has long been a perplexing problem for cost analysts. Few doubt that increasing production up to the *planned rate* would lower unit cost. This is because available capital and labor (both direct and indirect) would be fully utilized. Similarly, producing at lower rate than planned would hinder efficiency and, thereby, increase cost.¹ However, numerous studies have failed to demonstrate this effect convincingly. This is because only gross measures have been considered. Such measures are subject to many offsetting distortions and discerning important factors within them is tantamount to unscrambling the eggs.

For example, quantity acts as a proxy variable for rate effects as well as the

¹Higher than planned rates would also increase cost but this has rarely been a problem because of overly optimistic defense planning.

multitude of other factors that drive cost. In particular, rate is a function of *plant* capacity and output. Most rate effects are spread across all products in a plant during a given time period. Thus, a decrease in production rate for one item produced in a process oriented plant may be compensated for by an increase for another with no decline in efficiency (i.e., increase in cost). Cost analysts must think about the "bigger picture" at a lower level of detail for many other issues as well to develop useful future estimates. Several variables in addition to the traditional weight, quantity, and cost must be considered in making estimates.

It is unlikely that cost analysts will be able to incorporate the additional considerations leisurely as top management (both government and contractor) will have to base critical decisions on an assessment of their cost implications. In February 1993, an ISPA Workshop in Los Angeles, I asked about 50 cost analysts who worked for defense firms if they provided senior management with:

- Estimates of the effects of budget reductions on direct and/or indirect costs,
- Analysis of cost implications of alternative business strategies (e.g., acquisitions, mergers, consolidations),
- Estimates of the cost or price of a competitor.

Fewer than 10 percent answered affirmatively to any of them. This indicates the poor job cost analysts as a group have done in expanding their turf and marketing their capabilities. That must change in an environment driven by budget scarcity.

CONCLUSION

More wrenching changes are in store for the defense community. Either new policies will be established that enable us to accomplish more for less by reengineering a bloated and inefficient establishment or national security will suffer. If effective changes are to be made, they must be guided by sound cost analyses.